been achieved. The present invention was described in connection with particular embodiments, but it is evident that numerous alternatives, variations, modifications and uses will be apparent to those skilled in the art in light of the foregoing description. For example, alternative deflection angles of incoming electron beams, alternative designs of aperture 80 to maximize secondary electron trapping while still providing the maximum possible transmission of the electron beam and alternative materials, voltages and spacings can be selected to vary the operating characteristics the depressed collector as contemplated by the invention. It will also be apparent to those skilled in the art that various other changes and modifications may be made therein without departing from the invention, and it is intended in the claims to cover such changes and modifications as fall within the spirit and scope of the invention.

[00021] CLAIMS

I claim:

1. An electron beam collector comprising:

an electrically conductive dissipation cavity;

a front wall located at one side of said dissipation cavity having an aperture to allow the passage of the electron beam into the cavity;

a rear wall in said dissipation cavity, opposite the front wall, positioned and shaped such that electrons which strike it, and secondary electrons, are captured in said dissipation cavity; and

a voltage source electrically connected to said collector.

2. A depressed voltage collector for use with a device emitting an electron beam containing electrons traversing into the collector where energy is recovered from the electron beam, said collector comprising:

means for depressing the voltage of said collector; and

means for trapping said electrons after they exit said electron beam device.

3. A depressed collector for use with a device emitting an electron beam containing electrons traversing into the collector where energy is recovered from the electron beam, said collector comprising:

means for decelerating said electrons after they exit said electron beam device; and

means for trapping said electrons after they exit said electron beam device.

4. A depressed voltage collector for use with a device emitting a sheet electron beam containing electrons traversing into the collector where energy is recovered from the electron beam, said collector comprising:

means for depressing said voltage of said collector; and

means for trapping said electrons after they exit said electron beam device.

5. A depressed voltage collector for use with a device emitting a large aspect ratio annular electron beam containing electrons traversing into the collector where energy is recovered from the electron beam, said collector comprising:

means for depressing said voltage of said collector; and

means for trapping said electrons after they exit said electron beam device.

6. A depressed voltage collector for use with a device emitting an electron beam containing electrons traversing into the collector where energy is recovered from the electron beam, said collector comprising:

an electrically conductive dissipation cavity;

a front wall located at one side of said dissipation cavity having an aperture to allow the passage of said electron beam into said cavity;

a rear wall in said dissipation cavity, opposite said front wall, positioned and shaped such that said electrons which strike it, and secondary electrons, are captured in said dissipation cavity; and

a voltage source electrically connected to the collector and to the device.

7. The collector of claim 6 wherein said rear wall is planar.

8. The collector of claim 6 wherein said rear wall is shaped such that said reflected electrons and said secondary electrons are captured in said dissipation cavity.

9. A depressed voltage collector for use with a device emitting a rectangular sheet electron beam of electrons traversing into the collector where energy is recovered from the electron beam, said collector comprising:

an electrically conductive dissipation cavity;

a front wall located at one side of said dissipation cavity having an aperture to allow the passage of said rectangular sheet electron beam into said cavity;

a rear wall in said dissipation cavity, opposite said front wall, positioned and shaped such that said electrons which strike it, and secondary electrons, are captured in said dissipation cavity; and

a voltage source electrically connected to said collector and to said device.

10. A depressed voltage collector for use with a device emitting a large aspect ratio annular electron beam of electrons traversing into the collector where energy is recovered from the electron beam, said collector comprising:

an electrically conductive dissipation cavity;

a front wall located at one side of said dissipation cavity having an annular aperture to allow the passage of said annular electron beam into said cavity;

a rear wall in said dissipation cavity, opposite said front wall, positioned and shaped such that said electrons which strike it, and secondary electrons, are captured in said dissipation cavity; and

a voltage source electrically connected to said collector and to said device.

11. A depressed voltage collector for connection to a submillimeter electromagnetic wave device containing a cathode and a body generating a rectangular sheet electron beam of electrons traversing into the collector where energy is recovered from the electron beam, said collector comprising:

an electrically conductive dissipation cavity;

a front wall located on one side of said dissipation cavity having a rectangular aperture to allow passage of said rectangular sheet electron beam into said interior cavity;

a conductive reflector electrically and mechanically attached to said interior cavity in said enclosure, opposite said rectangular aperture, positioned at an angle to said incident rectangular sheet electron beam to reflect the electrons into the interior cavity; and

means for electrically energizing said collector such that the total voltage difference between said collector and said cathode is significantly less than the voltage difference between said cathode and said device body.

12. A single stage depressed voltage collector for use with a device emitting an electron beam containing electrons traversing into the collector where energy is recovered from the electron beam, said collector comprising:

means for depressing the voltage of said collector; and

means for trapping said electrons after they exit said electron beam device.

13. A single stage depressed voltage collector for use with a device emitting an electron beam containing electrons traversing into the collector where energy is recovered from the electron beam, said collector comprising:

an electrically conductive dissipation cavity;

a front wall located at one side of said dissipation cavity having an aperture to allow the passage of said electron beam into said cavity;

a rear wall in said dissipation cavity, opposite said front wall, positioned and shaped such that said electrons which strike it, and secondary electrons, are captured in said dissipation cavity; and

a voltage source electrically connected to the collector and to the device.

14. The collector of claim 13 wherein said rear wall is planar.

15. The collector of claim 13 wherein said rear wall is shaped such that said reflected electrons and said secondary electrons are captured in said dissipation cavity.

16. A single stage depressed voltage collector for connection to a submillimeter electromagnetic wave device containing a cathode and a body generating a rectangular sheet electron beam of electrons traversing into the collector where energy is recovered from the electron beam, said collector comprising:

an electrically conductive dissipation cavity;

a front wall located on one side of said dissipation cavity having a rectangular aperture to allow passage of said rectangular sheet electron beam into said interior cavity;

a conductive reflector electrically and mechanically attached to said interior cavity in said enclosure, opposite said rectangular aperture, positioned at an angle to said incident rectangular sheet electron beam to reflect the electrons into the interior cavity; and

means for electrically energizing said collector such that the total voltage difference between said collector and said cathode is significantly less than the voltage difference between said cathode and said device body.

17. A method for recovering energy from an electron beam containing electrons emerging from an electromagnetic wave device into a collector, comprising:

depressing the voltage of the collector; and

trapping said electrons in the collector.

18. The method of claim 17 wherein said electron beam is a sheet electron beam.

19. The method of claim 17 wherein said electron beam is a large aspect ratio annular electron beam.